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# NAVAL POSTGRADUATE SCHOOL

## Monterey, California



# THESIS

EVALUATION OF UNIFORM COST ACCOUNTING SYSTEM  
TO FULLY CAPTURE DEPOT LEVEL REPAIR COSTS

by

David Richmond O'Brien  
December 1985

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Evaluation of Uniform Cost Accounting System  
to Fully Capture Depot Level Repair Costs

by

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Submitted in partial fulfillment of the  
requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

from the

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December 1985



## ABSTRACT

The purpose of this research project is to evaluate the capability of the Uniform Cost Accounting System as defined in Department of Defense Instruction 7220.29-H to fully capture depot level repair costs. Its methods of accumulating, standardizing, and reporting cost elements at the San Antonio Air Logistics Center are examined. Analysis of similarities in methods used in calculating stabilized rates used for customer billing, the actual cost accounting system, and the 7220.29-H reporting requirements and how these systems comprise the overall control system at SA-ALC is emphasized. The analysis in this study is based on information obtained from internal documents and an on-site visit to the San Antonio Air Logistics Center. The results of this study indicate that while there are discrepancies in the stabilized rate, cost accumulation, and 7220.29-H reporting system, the discrepancies are not significant.

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## I. INTRODUCTION

### A. THESIS OBJECTIVE

The purpose of this thesis is to document the manner in which the San Antonio Air Logistics Center (SA-ALC) accumulates, standardizes, and reports the information used to formulate the stabilized rates used in its billing of customers.

Specifically, the research has three aims: First, to compare textbook cost systems with those systems in place at the San Antonio Air Logistics Center. Second, to study the similarities in the systems used to accumulate, record, and report the actual cost accounting information at SA-ALC with the information system used in budgeting process for stabilized rates. Third, to discuss the relationship between the stabilized rates and the reporting requirements of the DoD Instruction 7220.29-H, "Depot Maintenance and Maintenance Support Cost Accounting and Production Reporting Handbook."

### B. METHODOLOGY

The research methods followed in this project consist of a series of semi-structured interviews with selected members of San Antonio Air Logistics Center management. Discussions of cost accounting procedures, budget formulation, production flow, management control systems, and stabilized rates were conducted over a period of two days at the Center. The

interviews were conducted by a team of three students of which one was chosen to ask questions while the others recorded the responses. After each interview, the members of the team compared notes and discussed potential areas of interest. The second method of research was the study of selected planning, control, and financial documents related to the cost accounting structure at SA-ALC.

### C. AREAS TO BE EXAMINED

Financial information reported by the depots to the Office of the Assistant Secretary of Defense (OASD) is used for comparisons of productivity, identifying duplication of repair capacity, and as a means for determination of management emphasis. This study looks at the information OASD receives to make its decisions and evaluate whether or not this information is indicative of the costs of maintenance operations at SA-ALC.

The information needed for budget formulation is taken directly from the systems used to accumulate actual costs at the depot. Therefore, after a brief introduction to the San Antonio Air Logistics Center and a discussion of the textbook example of a financial accounting system, the budget process is examined, followed by a comparison of this system with the one used for actual costing. Analysis of variances between the two are used to check the validity of the information base. Finally, a discussion of the reporting requirements of the 7220.29-H is conducted ending with a direct comparison of 1984



actual figures reported internally at SA-ALC with those 1984 figures received by OASD. In the final section, major findings, conclusions and recommendations for further study are presented.

## II. DEPOT LEVEL MAINTENANCE

This chapter discusses the mission, organization, and environment of the depot level maintenance structure at the San Antonio Air Logistics Center. Also discussed is a theoretical framework around which a financial accounting system should be structured.

### A. ORGANIZATION

The San Antonio Air Logistics Center is one of five ALCs in the Air Force Industrial Fund structure. It is located at Kelly Air Force Base in San Antonio, Texas. SA-ALC falls under the command of the Air Force Logistics Command (ALFC) headquartered at Wright Patterson Air Force Base in Ohio. The Air Force Logistics Command reports to the Air Staff in Washington, D. C. who reports to the Secretary of the Air Force, who in turn, reports to the Secretary of Defense. The San Antonio Industrial Fund complex at Kelly AFB encompasses four separate activities; the San Antonio Real Property Maintenance Activity, Laundry and Dry Cleaning Services, Airlift Services, and Depot Maintenance Services. [Ref. 1]

The organizational structure of the SA-ALC depot facility is made up of four directorates; the Directorate of Material Management, Directorate of Contracting and Manufacturing, Directorate of Distribution, and the Directorate of Maintenance.

It is this last Directorate, the Directorate of Maintenance, with which this study is primarily concerned. [Ref. 1]

The Directorate of Maintenance is divided into four administrative divisions: Management Support (MAA), Resources Management (MAW), Plant Management (MAD), and Quality Assurance (MAQ), and three operational divisions: Aircraft (MAB), Engines (MAE), and Technology Repair (MAT). The head of the Directorate of Maintenance is an Air Force Colonel, with a combination of Air Force officers and civilians in charge of the separate divisions. The Directorate of Maintenance at SA-ALC employs approximately 8270 people housed in 43 separate buildings with \$248.8 million in plant and equipment. During the course of FY85, SA-ALC will generate close to \$473.7 million in sales. [Ref. 1]

#### B. MISSION OF THE AIR LOGISTICS CENTER

Depot maintenance as defined in DoD Inst. 4151.16 is the ". . . maintenance which is the responsibility of and performed by designated maintenance activities, to augment . . . and support Organizational Maintenance and Intermediate Maintenance activities . . . ." The capabilities of the depot include, but are not limited to, the inspection, test, repair, modification, alteration, modernization, conversion overhaul, rebuilding and reclamation of parts and equipment end-items. [Ref. 2]



The primary depot maintenance responsibility of SA-ALC falls under three categories: aircraft, engines, and exchangeables (engine related and other). Aircraft programmed for repair at SA-ALC in FY 85 include the B-52, C-5, C-130, and OV-10. The engine workload is distributed among the T56, GTE, F100-200, and the TF39. Exchangeables (engine related) are engine fuel system components, gas turbine & jet engines components, engine electrical systems, and anti-ice valves, pumps, and starters. Exchangeables (other) include aircraft structural components, aircraft maintenance, electrical & electronic properties, and compressors. [Ref.1]

#### C. FINANCIAL ACCOUNTING SYSTEMS

The overall purpose of a financial accounting system is to provide information that is useful and understandable to its external audiences. Three specific aims of general-purpose financial reporting are:

1. To provide information that is useful to present and prospective investors and creditors and other users in making rational investment and credit decisions.
2. To furnish information to aid users in assessing the amounts, timing, and uncertainty of prospective cash receipts associated with investments in the depot.
3. To report information about the economic resources of an enterprise, the claims to those resources, and the effects of transactions and events that change those resources and claims to them.[Ref. 3]

Under the first objective, financial information is used primarily in the determination of the attractiveness of a firm

as an investment outlet. Here, the attractiveness is in the eyes of the Congressional committees that appropriate the monies to the industrial funds.

The second objective asserts that critical to these decisions is information concerning prospective cash receipts to the industrial fund. Unlike the private sector where dividends and interest payments concern the investor, in the public sector the paramount concern is in keeping the industrial fund in a condition to meet its commitments to the individual depots. Rational investment and credit judgements depend directly on predictions of future cash flows to the industrial fund. Financial accounting should supply inputs, primarily in the form of information on past performance and existing financial position, to allow users to assess the amounts, timing, and uncertainty of net cash flows to the industrial fund.

The third objective can be divided into four sub-objectives (of which three apply to depot financial reporting) which detail specific kinds of information to be reported:

1. Information about a depots' economic resources, obligations, and the difference between them.
2. Information about a depots financial performance during a period as measured by how closely the depot approaches a profit/loss goal.
3. Information about an enterprise obtains and uses funds, about its borrowings and repayments, and about other factors that may affect its liquidity and solvency.  
(not applicable to the depots)

4. Information about how the management of the SA-ALC has discharged its stewardship responsibility.

Financial accounting has three primary reports that respond to the specific needs of (1), (2), and (3). Objective (4) is satisfied directly by historical information which OASD can use to appraise the effectiveness of management in administering the resources of the depot.[Ref. 4]

Basic concepts to guide the preparation and interpretation of financial accounting reports have been established to help achieve these objectives. These concepts are called generally accepted accounting principles (GAAP). They determine what information is to be recorded, how measurements are to be made, and how the data are to be presented in the financial statements. This uniformity is absolutely essential for the comparative analyses carried out by OASD and the other users of the depot financial data.[Ref. 4]

In the public sector the GAAP followed by the depots falls under those regulations established by the Cost Accounting Standards Board (CASB). This board was established on August 15, 1970 by Congress and its purpose stated as follows:

The Board shall . . . promulgate cost-accounting standards designed to achieve uniformity and consistnecy in the cost-accounting principles followed by defense contractors and sub-contractors under Federal contracts. Such promulgated standards shall be used by all relevant Federal agencies . . . in estimating, accumulating, and reporting costs in connection with the pricing, administration, and settlement of all negotiated prime contract and subcontract national defense procurements with the United States in excess of \$100,000.[Ref. 5]



The CASB's pronouncements are in general harmony with sound accounting concepts and techniques and with generally accepted accounting principles. These pronouncements deal with all aspects of cost allocability, including:

1. The definition and measurement of costs which may be allocated to cost objectives.
2. The determination of the cost accounting period to which such costs are assignable.
3. The determination of the methods by which costs are to be allocated to cost objectives.

The technical view of financial accounting systems asserts that they provide information to many separate, and diverse groups of users. In order to fulfill this role, the system must accumulate, analyze, measure, interpret, classify, and summarize the results of each of the many business transactions that affect the organization in a specified period.

In the private sector, the audiences of the financial data prepared by the organization consist of owners, employee and labor organizations, creditors and lenders, tax authorities, regulatory agencies, managers, and customers. However, in the public sector, the users are quite different. The owners can be said to be the taxpayers of the United States government although they obviously are not owners in the common sense. They are not present or prospective investors and are not deciding whether to increase, retain, or reduce their investment in the business. It can also be argued that the "owners"

of the depots are represented by the Congressional bodies who ultimately decide how and where the funds to operate them will come.

While government employees obviously take an interest in their organizations standing, they do not use the financial accounting output to negotiate higher wages or increased benefits. Those items are decided by the lawmakers and bear no relationship to the profit and loss statement of the depot.

The creditors in the public sector have only to worry about when their payments will arrive, not if they will arrive. The regulatory agencies that look at the depot's financial system are government agencies that differ from those that regulate the private sector.

The managers of the financial system fall into two separate categories. Under the centralized organization structure that categorizes the Air Force Industrial Fund, the individuals ultimately involved in the primary decision making process are in the Office of the Assistant Secretary of Defense (OASD). This office decides the amount of work, the makeup of that work, and the prices to be charged for the work performed. The depot itself is where the everyday decisions are made and where the financial accounting system originates. However, the financial accounting data generated at the depot is used almost exclusively by the OASD managers. This is in line with the private sector with the major difference being that the data generated for internal purposes is used almost solely

by the depot, with no input of there data to the decision makers at OASD. This point is discussed more in depth in later chapters.

The customers of the maintenance depots are another class of users of financial information that differs significantly from the private sector. In the private sector, the customers want to be convinced that the organization with which they are doing business is an on-going concern, or one which will continue indefinitely. In the public sector, the customers of the depots are assured of this fact without having to worry about the solvency of the depot. One way or another, their aircraft, ships, or hardware, will be repaired. Also in the private sector a customer has the luxury of shopping around for the best price, the best service, or the best overall package where the public sector customer has no such benefit. A customer of the Air Force Industrial Fund is told when, where, and how to take his product to be fixed. Most importantly, the customer is told the price for that service with no recourse available. This point is discussed in more depth when the subject of stabilized rates is addressed as this is foundation upon which stabilized rates are built.

As mentioned above, the primary user of the financial accounting information developed by the San Antonio Air Logistics Center is OASD. Although OASD is usually not directly involved in the actual operations of the depot they do have authority to demand specific financial information

from the depot. This information is the uniform cost accounting system developed by OASD and is discussed in the next section. In requesting this information, OASD is presumed to possess three characteristics of a user audience:

1. Technical competence-Users of general purpose financial statements are understood to be familiar with business and economic activities and to understand accounting language and information.
2. Comparative analyses-In their analyses, users of the information might wish to compare one business entity with another and the results of one entity over successive periods of time. This, in fact, is what OASD and the Congressional bodies are supposed to do with the information they compile from the separate depots.
3. Interpretive preference-This characteristic concerns the degree to which users are willing to have the preparers of information inject their judgements or interpretations of future events into the financial statements. Under the rigid, computerized format imposed by OASD, the separate depots have little, if any, chance to inject their own judgements. Again, we will look at this format in depth in the next section.[Ref. 4]

The depot's financial accounting system has been derived from actual cost accounting practices employed by Government and contractor maintenance activities, available information on the subject, and the promulgations of the OASD. In order for the financial accounting system to perform its function, it must meet all of the requirements set forth above. If it does not, then decisions are being made based on erroneous information and misrepresentation of the facts may result.

The next chapter begins to outline the financial accounting structure of San Antonio Air Logistics Center and how it is used in the budget process to help formulate the



stabilized rates used for billing purposes. Chapter IV examines the methods used at SA-ALC to compare the figures compiled by the actual cost system with those in the budget. Chapter V concentrates on how the budget and actual systems are reported in the 7220.29-H system to OASD.

### III. STABILIZED RATES

This chapter looks at the stabilized rate system in the Air Force Industrial Fund. An examination of how and why the concept of stabilized rates was developed and the methods used to formulate the rates in the budget process are discussed.

#### A. DEFINITION OF STABILIZED RATES

Stabilized rates are the dollar rates charged to the customers of the Air Force Industrial Fund for maintenance performed to service and repair submitted items. These rates are computed in the budget process and are broken out by aircraft, mission design, category of repair, cost center (Resource Control Center or RCC), and cost element (labor, material, and overhead). Examples of the rates computed for Fiscal years 1984-86 are given in Figure 3-1.

The depot formulates the rates each year during the budget process. After the rates are drafted at the depot, they are forwarded to the Air Force Logistics Command (AFLC) for finalization. AFLC considers inflation/deflation factors, additions to the industrial fund asset capitalization program, and overall fund liquidity when making adjustments to the submitted depot rates. The overall goal of AFLC is to ensure the industrial fund maintains a sufficient level of working capital to maintain its operations. In order to do this, the

	<u>1984</u>	<u>1985</u>	<u>1986</u>
Direct labor	\$14.09	\$14.02	\$14.30
Direct Material	24.40	25.03	24.41
Production Indirect	12.81	13.95	12.35
G & A	<u>10.94</u>	<u>13.18</u>	<u>9.81</u>
Total Rate	\$62.24	\$66.18	\$60.87

SOURCE: 1987 SAN ANTONIO SALES RATE BROCHURE

Figure 3-1

Stabilized Rates  
San Antonio Air Logistics Center  
1984-86

factors applied by AFLC to the depot's rates may cause one depot to operate at a loss while another operates at a profit. The fund-wide goal is a zero profit/loss.[Ref. 6]

B. HISTORY

1. Objectives of Rate Stabilization

Beginning in fiscal year 1976, the department of defense established price/rate stabilization concepts in its five (5) industrial funds. The rate stabilization concept was designed (a) to stabilize prices in the industrial funds at realistic rates (b) to assure adequate cash in the funds for revolving fund purposes (c) to minimize problems dealing with

price inflation, and (d) to help alleviate financing and managerial problems between the funds and the customers' appropriations activities.

Although some sort of price/rate stabilization existed well before FY 1976, problems in the conceptual design created difficulties for industrial fund users. The fund was able to change the rates charged to its users to keep up with the rapidly rising rate of inflation. As a result of the double-digit inflation of the mid-1970's fund managers frequently changed the prices they charged their customers. Subsequently, because of the changing rates, it became difficult for the customers to effectively budget their O&M funds. Additionally, even though the fund managers were allowed to change their rates on a quarterly basis, price increases were unable to keep pace with rapid inflation resulting in an erosion of the industrial funds working capital. In 1976, a new method of rate stabilization was employed.

## 2. Concepts of Rate Stabilization

Under this new concept, the following principles pertaining to fixing prices would be followed:

1. Fund prices will be established and published once a year at the beginning of each fiscal year.
2. Prices will not be changed during the year except in the case of significant error or change in the unit of issue.
3. The stabilized pricing of services will be based on the costs per the books (material, labor, and overhead) plus an inflation factor for growth.

4. The customer will use the same inflation surcharge in calculating his O&M appropriation budget request.[Ref. 1]

While these new guidelines significantly helped the customers in budgeting their appropriations, at the same time, it severely curtailed the ability of the individual maintenance depots to approach a zero profit/loss for a fiscal year.

### 3. Drawbacks of System

The major drawback of the stabilized rate system is the time span involved in the budgeting process. In reality the industrial fund manager is setting down a price for labor, materials, and overhead in July of 1985, for which he will be held accountable throughout FY 87. Separate inflation factors for growth in civil service employment, wage board employment, and general purchases are figured in but will by no means be exact. Before the stabilized rates were established, the fund managers could adjust the rates charged to the customers on a quarterly basis and were able to close out a given fiscal year within a couple of million dollars of a zero profit/loss posture. With the inception of stabilized rates, the fund managers can now change the rates only under the conditions:

1. To bring prices in line with costs on high profit/loss items when the combined increases and decreases have no negative impact on a customer.
2. To reduce prices as a result of new methods, processes, equipment, or management techniques with no negative impact on the customer.[Ref. 1]

The key phrase is "no negative impact on customers." Even if an industrial fund experiences an increase in the price of



materials, a different workload schedule than originally planned, or an unanticipated labor standard/usage change, the managers cannot reformulate their rates if the change has a negative impact upon the customers. Subsequently, the industrial funds frequently find themselves in significant loss situations. Throughout the process known as negative/positive recoupment, next years stabilized rates will attempt to even out any profits or losses experienced in the previous years. Unfortunately, this has the effect of amplifying peaks or troughs in the outyear profit/loss picture because of the effect of work in process.

In order to better illustrate the concept of stabilized rates, the process followed by the San Antonio Air Logistics Center in formulating their budget estimates follows. This is because stabilized rates are developed as part of the overall budgeting at depots. The budgeted numbers for a fiscal year are allocated to the separate cost centers, repair group categories, and the items that are going to be repaired. This is done in order to come up with stabilized rates for each of these categories. The Air Force Logistics Command then takes the rates submitted in the Budget Estimate and applies factors for inflation, asset capitalization, and other factors to allow the entire Air Force Industrial Fund to operate at a zero profit/loss figure.

### C. STEPS IN COMPUTING STABILIZED RATES

There are eight (8) activities that need to be completed in the formulation of stabilized rates. They are:

1. Program Objectives Memorandum (POM) formulation
2. Workload Planning
3. Productivity Guidance from AFLC
4. Formulation of Material Standards and Expenses
5. Planned Labor Application
6. Labor Expense and Rate Development
7. Development of Production Overhead
8. Other Expenses.

These activities are part of the overall budget process. In the discussion which follows, there are references to different years. For example, the execution year is the fiscal year under whose budget the depot is presently operating. Throughout this discussion, the execution year (FY 85) is referred to as Y0. The prior year (Y-1) is the most recent year for which costs have been accumulated and is represented by FY-84. The upcoming year (Y+1) is that year for which stabilized rates were formulated 12 months ago (FY 86), and the budget year (Y+2) is the year for which rate stabilization is now underway (FY 87). The budget year is the year for which the depot is now formulating numbers to be used for submission to HQ USAF for inclusion into the Presidents Budget. During the

formulation of the budget year's figures, the depot will receive the sales rate's to charge in the upcoming year (Y+1). The timeline in Figure 3-2 will help in following the stabilized rate process explanations.

1. Program Objectives Memorandum Formulation

One of the first activities that needs to be completed in the stabilized rate process is formulation of the Program Objectives Memorandum (POM). The purpose of the POM is to express total program requirements in terms of manpower, material and costs to satisfy responsibilities of the Five Year Defense Plan submitted by DoD. The POM provides the direct product actual hours (DPAHs) and dollars broken out by items repaired. To do this, HQ (AFLC) submits actual data for manpower, material, and costs the past fiscal year and requirements for the next six years. After review for validity, this document (referred to as the G035B Baseline) becomes the Program Objectives Memorandum baseline. This baseline is used for establishing and publishing fund prices at the beginning of each fiscal year locking in a stabilized rate for a customer. As shown in Figure 3-2, the entire process starts 24 months before the beginning of a fiscal year. Direct product actual hours resulting from this process are used throughout the stabilized rate formulation process as a basis for figuring the separate rates for the different cost elements and cost centers.[Ref. 7]

#### FISCAL YEAR 1987 FORMULATION:

- Oct 1984- 1. POM baseline set by AFLC based on actual data from FY 84. Requirements for FY 85-91 are also included.
- Nov 1984- 2. Air Staff passes manpower allocations to AFLC who pass it along to San Antonio Air Logistics Center.
3. AFLC distributes productivity guidance to SA-ALC.
4. Definition of Material Standards begins for budget process. Once completed, material expenses are formulated.
5. Preliminary PLA is developed.
- Jan 1985- 6. Labor rates and expense calculations are begun.
7. Production Overhead computations begin.
8. Other expenses are calculated.
- Apr 1985- 9. Current year (FY-86) stabilized rates are received from AFLC in the Programmed Budget Decisions. Using these adjustments, the depot finalizes its labor, material, and overhead stabilized rates for the approaching fiscal year and computes budgeted profit/loss.
- Jul 1985-10. Depot submits the Sales Rate Brochure and the Budget Estimate to AFLC.

Figure 3-2

Stabilized Rate Process Timeline

## 2. Workload Planning

The next step in the process involves workload planning. Twenty-four months before FY 87 begins, (approximately 1 Nov 1984) the depot receives its authorized personnel numbers from AFLC. These numbers breakdown the workforce of SA-ALC into civilian and military and are allocated so as to maintain the same relative size among its centers. The authorized numbers also breakdown the labor force into direct, production overhead, and G & A hours as well as regular, overtime, and holiday hours among the civilians and military. This end strength number will be used by the centers throughout the year for budgeting and workload planning. Total direct labor hours taken from this data are divided into total production overhead costs and G & A expenses to arrive at the proposed overhead rates for the budget year.[Ref. 7]

## 3. Productivity Guidance From AFLC

Around this time, productivity guidance is being prepared by AFLC for San Antonio to use in their budget preparation. The guidance arrives in the form of output per paid man-day (OPMD) goals. Output per man-days are computed by subtracting holiday leave, indirect and overhead on duty time from the hours available per year, and dividing by the number of days per year. Its primary purpose is to challenge the Centers with meaningful goals for budget submission. The information used to produce this guidance is taken directly



from historical data submitted by SA-ALC. Actual figures from Y-1 and Y-2, as well as projections for Y0, Y+1 and Y+2 are provided in the guidance.

#### 4. Material Standards and Expenses

The next activity that is required is the review and revisions of material standards and formulation of material expenses. In the beginning of November 1984 after the end strengths are calculated in the format specified by AFLC, work begins on reviewing and defining the material standards. In order to set a sales price for materials used in the future repair of an item, there must be an historical standard for materials used in the past. The process begins with the Financial Management and Analysis Branch (MAWB) providing the Engineering and Planning Branches of the Aircraft, Engine, and Technology Divisions with a list of control numbers for which standards need to be reviewed. Each individual division will validate the standards on each item listed. The separate divisions will then review the Master Usage Analysis Report and compare the past years material usage with the validated material standards. Where the report indicates changes are required, analysis will be performed and if needed, changes will be made in the standards.[Ref. 7]

While the divisions are reviewing the standards, the depots' financial division is developing material expenses for Y+2 (budget year) and updating those for Y+1 (upcoming year).

Funded (expense) and unfunded (exchange and other) materials are accounted for at SA-ALC. Funded materials are those purchased through the stock fund and requiring reimbursement from another funding source. Unfunded materials are procured through an Appropriations Purchases Account and require no reimbursement from the user when issued. Essentially, the unfunded material is free material to the depot. Both categories are needed to establish end items sales prices (EISP), one of the requirements of the Logistics Command. Unfunded material is developed from history by cost center and input into the Operating Cost Based Budget(OCCB) for development of a cost center materials rate. Funded material is developed from history and known changes, and is displayed by different categories such as System Support Stock Fund, General Support Stock Fund, fuel, tools, equipment, etc. The System Support Stock Fund accounts for seventy-five percent of the funded material usage at San Antonio Air Logistics Center. Funded material, as a budgeted expense element, is also broken out into three categories of direct, indirect (production overhead), and G & A.[Ref. 7]

To compute direct materials, historical cost center hourly rates are obtained from the historical cost accumulation system. Next, the divisions approve these rates as they are or submit justifiable changes. After receiving the approved rates from the divisions, AFLC provided inflation factors are

applied to the rates by the financial analysis division. The inflated, approved rates are then multiplied by the cost center's projected earned hours for the budget year to arrive at the annual material usage expense by cost center. This total constitutes the projected annual direct material expense for that cost center for the budget year. Indirect material budgeting is figured in the same manner as direct material for the production center's (those receiving direct labor hours). For the non-production cost center's (those not earning direct labor hours), material usage is developed from the historical files, known changes, and inflation. In developing G & A material usage, trends in staff usage of material is considered.[Ref. 7]

Along with a material rate by cost center, AFLC requires the depots to develop a rate by commodity. Historical data is extracted from the Depot Maintenance Production Cost System by Repair Group Category (RGC). There are fourteen (14) separate Repair Group Categories that specify on what type of items the work is being performed. Examples are: Programmed Aircraft (RGC A), Unprogrammed Aircraft (RGC B), Engines Programmed (RGC E), and Exchangeables (RGC J). Next, the historical rates are adjusted using workload trends from the Workload Programming, Planning, and Control System, the Major Items Subject to Repair (MISTR) Requirements Schedules and Analysis System, and the Engine Schedule. This commodity

total is then compared to the cost center material expense total just discussed to see if there are any significant differences. If there are, then an adjustment is necessary to bring them into line with each other.[Ref. 1,7]

#### 5. The Planned Labor Application (PLA)

Next, the depot needs to ensure that the requirements they are going to fulfill in the budget year, can be accomplished with the labor force that they possess. In the past, customer requirements usually exceeded the capabilities of the depots. Therefore, a balance must be worked out between the customers requirements and the level of services that the depot can provide. This balance is reached by translating the workload requirements for Y+1 (budget year) into a planned labor application (PLA) format to get a feel for the personnel equivalents (PE) that would be required in each cost center to accomplish the customer's requirements. Next, historical experience, anticipated funding realities, and workload priorities are studied to attempt to get the PLA into a workable form. When the personnel equivalents approximate the workload required, the depot can begin to organize its production organization to meet these requirements.[Ref. 7]

#### 6. Labor Development

After the PLA formulation, labor expenses need to be computed. In developing labor expenses, two calculations need to be performed. First the total labor expense for the depot must be computed manually by multiplying the total paid hours

for the year by an average accelerated labor rate for general schedule and wage grade personnel. Secondly, budgeted labor costs by cost center are calculated by multiplying the cost center's on duty hours by an accelerated hourly rate. Both of these calculations are discussed.[Ref. 4]

a. Total Labor Expense

To find the total budgeted labor expense, the PLA is used. Total paid hours are taken from the PLA and multiplied by an accelerated hourly labor rate for General Schedule (GS) and Wage Grade (WG) personnel. The total paid hours are converted from the man-years on the Manpower Capability Worksheet prepared by the accounting division. An average GS/WG labor rate is computed by taking the basic average salary from the Civilian Manpower and Funding Report, dividing by the number of paid hours directed by the logistics command for P+1 (upcoming year) and multiply this hourly figure by the paid hours for P+2 (budget year). The accelerated labor rates are computed by calculating estimated factors for annual leave, sick, holiday, and other leave and the governments share of personnel benefits to arrive at an accelerated factor. This factor is then applied to the total hours to arrive at the total budgeted labor expense.[Ref. 7]

b. Budgeted Cost Center Labor Costs

Now that the total labor expense has been computed, it is allocated to the cost centers by cost elements (materials,



labor, and overhead). Accelerated cost center hourly labor rates extracted from the Maintenance Labor Distribution and Cost System are multiplied against the center's direct, indirect, and overhead on-duty hours. The direct on-duty hours are the actual hours of production by cost center. These hours are found by dividing the budgeted standard hours by the budgeted cost center efficiency rate. The indirect on-duty hours are those hours expended which do not contribute directly to the repair of the finished product. The indirect hours are found by multiplying the direct product actual hours by the indirect factors taken from the budgeted indirect factors listing. The overhead on-duty hours are supplied by the manpower division. These dollars then represent the breakdown by cost element of the total labor expense.[Ref. 7]

#### 7. Development of Production Overhead

As with labor and material, the production overhead requirements to support the direct production workload must be formulated. The overhead divisions conduct reviews of historical data and the budgeted workload programmed to arrive at the projected overhead. Each division submits its requirements to the Director of Maintenance for approval. Using the PLA as guidance of the workload expected in the budget year, overhead requirements are developed to support the direct production effort. The direct labor hours are taken directly from the PLA and the budgeted material and labor expenses are taken from the Depot Maintenance Production Cost System.

Dividing the total production overhead and G & A expenses by the direct labor hours, gives the overhead rates applicable to the separate cost centers.[Ref. 7]

#### 8. Other Expenses

Those expenses not classified as labor or material related are also developed. An internal budget call is forwarded to the appropriate divisions for requirements for current and budget year. After formulation and forwarding to the financial analysis branch, the figures are compared with the costs of previous years and any deletions or additions are discussed with the individual division. G & A expenses are then allocated to the production centers on a percentage of total workload basis to arrive at a cost center G & A hourly rate.[Ref. 7]

#### D. COMPARISON OF SUBMITTED DEPOT RATES WITH AFLC APPROVED RATES

In April the Program Budget Decisions (PBDs) for the stabilized rates are issued from HA AFLC to the Centers in terms of broad cost areas. As a result, changes from the upcoming years budget submission of 12 months ago, are broken down into cost elements compatible to those of the approved cost center rate file with the exceptions of depreciation costs and the profit/loss adjustment.

#### 1. Expense Changes

The initial labor breakout is in terms of general schedule (GS) and wage grade (WG) labor expenses. The labor

figures that were submitted a year ago are compared to the adjusted dollars to ascertain the changes in each of these labor expense elements. The changes in both the GS and WG expense categories are then prorated to direct, production overhead, and general and administrative labor cost elements. Material costs are subdivided into the same expense categories as the labor cost elements and the variances between the submitted and adjusted expense are handled in the same manner [Ref. 7]

## 2. Rate Changes

The per hour adjustments in direct labor, direct material, production overhead, and G & A are applied to the submitted figures to arrive at the new hourly rates. Once the hourly adjustments are completed, they are inputted to the corresponding expense elements of the approved cost center rates and commodity sales rates to arrive at the new figures for the upcoming year (Y+1).

## 3. Projecting Revenue

"What if?" analyses are conducted by multiplying the new rates against the proposed workload to arrive at an adjusted revenue figure. These projected revenue dollars plus the projected carryover revenue dollars are then compared to the latest expense projection. Also, analyses are conducted of the adjusted approved cost center rates versus P-1 approved rates and historical data. The same comparative analyses are conducted using the commodity sales rate versus the P-1 rate and historical data.[Ref. 7]

Planning rates for Y+1 (FY 86) adjusted by the PBDs then become the submitted stabilized rates for the upcoming year and are sent back to HQ AFLC for final approval. Customer requirements are then priced again using the revised rates and negotiated quantities. Comparison between Y+1 customer requirements and anticipated sales by commodity is then made. This will highlight customer unfunded requirements and possible future problems resulting from this shortfall. Adjustments may be required in the sales for Y+1 if there is a shortfall. This possible renegotiation of sales will result in revised end of year position of sales, cost of sales, WIP, and operating results. These revised factors will now be used in developing revenue rates for the Budget Estimate.[Ref. 7]

#### E. BUDGET SUBMISSION

##### 1. Operating Cost Based Budget (OCBB)

The Operating Cost Based Budget (OCBB) is now ready to be developed by the Depot Maintenance Budget and Management Cost System and submitted to AFLC. A separate run is made for both Y+1 (upcoming year) and Y+2 (budget year). The upcoming year run is used to compare these newly developed cost rates with adjusted revenue rates to determine profit and loss projections. They are also used by the cost system as the budget baseline on the monthly cost report. The budget year run is used as the initial development of cost center rates to be used for cost and revenue projections. [Ref. 7]

## 2. Computing Final Commodity Rates

Once the OCBB has been developed, the depot needs to transfer the OCBB center rates from the budget cost system to the Workload and Program Control System to compute final commodity rates and end item sales prices. This is done by interfacing the two systems and ensuring that there is a cost center rate for each center that has a capability in it in the PLA.[Ref. 7]

## 3. Submission of Sales Rate Brochure

The final step in the stabilized rate formulation process is to submit the Sales Rate Brochure to AFLC. The brochure is compiled manually, and contains a detailed 3-year comparison of cost rates and cost based sales rates and sales prices. Hourly rates that are required to be included in the sales brochure are listed in Appendix A. [Ref. 7]

In this chapter we looked at the concept, history and formulation of stabilized billing rates. In the next chapter, examination centers around the system used by SA-ALC to accumulate its actual costs and make its everyday managerial decisions. If the standards and procedures used in the computation of the sales rates are accurate, then the numbers recorded by the actual cost system should be close to those defined here in Chapter III.



#### IV. ACTUAL COST SYSTEM AT SA-ALC

In Chapter III the method by which the San Antonio Air Logistics Center formulates its customer billing rates for the stabilized rate system (budget process) was discussed. In this chapter, discussion centers around how actual costs are accumulated, recorded and placed into the cost accounting system. Special emphasis is placed on analyzing the variances between the actual accounting system and the stabilized rate system.

At the San Antonio Air Logistics Center, costs are accumulated by job or specific order. Each job is charged with its own direct costs, as well as a portion of the indirect costs including overhead and general expenses, at a predetermined basis. A sale is normally recognized upon completion of the job. In understanding this system, and examination of the flow of costs through SA-ALC is reviewed first. This is followed by methods used by SA-ALC to accumulate and analyze the variances between the actual cost system and the budgeted figures.

##### A. FLOW OF COSTS

###### 1. Induction of an Item

When an item is brought to San Antonio for repair, it is assigned a job order number by the Job Order Production

Master System. Initially, the system assigns a job status of "zero" to the item to indicate that the job is in work-in process. Work-in-process is that account that accumulates the materials, labor, and overhead while the item is undergoing repair.[Ref. 1]

## 2. Labor Accumulation

The Labor Distribution and Cost System records actual hours performed by the cost center as labor hours (direct, indirect, and overhead) are accumulated. These labor hours are recorded as duty codes. Duty codes are two-digit numbers that signify in what element of labor an employee is working. The percentage of work done in a given date is figured on a direct product earned hours basis. Direct product hours earned are nothing more than the standard hours times the number of units completed.[Ref. 1,8]

## 3. Materials Accumulation

Direct and indirect material usage is reported in the Maintenance Actual Material Cost System. The cost centers on the floor send requisition for the required materials. The materials are issued and the system automatically accumulates the costs of that material to the appropriate job order. At the end of the month, the cost system summarized direct, overhead, and G & A costs using computerized links among the cost and data systems. Costs from overhead cost centers are distributed to production cost centers using the hours that a worker spent performing direct labor hours, reported by duty code, as an allocation basis.[Ref. 1,8]

#### 4. Distribution of Costs

Monthly data from the different systems are then input into the Depot Maintenance Production Cost System. Costs are distributed to the JONs based upon direct product earned hours reported. If no earned hours are reported on a job order but direct material is used, the costs of that material is placed in a suspense account until earned hours are reported. If a cost center fails to report earned hours, no direct labor, overhead, or G & A costs are distributed to the cost accumulation system.[Ref. 8]

As long as hours are reported, jobs continue to accumulate costs in the work-in-process account. When a job's induction units equal completions, the job status switches from zero to one and the item, and its associated costs, are transferred to finished goods. The costs associated with the job order are then reflected as costs associated with revenue earned. After this time if additional hours are reported for a job, the costs related to there hours (trailing costs) are reflected as cost of sales. Once job status "two" is reached, the job is closed and no additional costs can be distributed to it. [Ref. 8]

#### B. VARIANCE ANALYSIS

##### 1. Users of Variance Analysis

The computerized cost accounting system at SA-ALC produces over 300 daily, monthly and quarterly management reports

to track job orders, cost data and profit/loss status. These reports are used by all levels of managers. The supervisors at the RCC level use reports that show job orders in their shop that are exceeding targeted costs. They receive one page summaries showing profit/loss and cost effectiveness for completed work and work-in-process. Other reports satisfy the informational need of management to trace the costs associated with the job orders and cost centers and to study actual figures vs. standards. Variance analysis is conducted using these reports to ensure costs of production (labor, materials, and other expenses), revenues, WIP, and overall operating results fall within the guidelines set in the budget process.

## 2. Reasons for Analysis

As discussed earlier, the process of budgeting for customer billing rates consists of taking historical data from the actual accounting system, applying indirect/efficiency factors, inflation rates, and Air Force Industrial Fund requirements and then formulating rates upon which the customers of the industrial fund can plan on for their working budgets. If the data used in formulating these rates are inconsistent or not indicative of the costs accumulated by the depot, then workforce allocation and resource requirements will be incorrect. This may result in inaccurate pricing which could cause severe discrepancies in the customers' budgets. The effects of less than accurate data, makes it imperative that the historical data used in the budgeting process meet all requirements set

down by generally accepted accounting principles. Variance analysis of revenue, cost of production (labor, materials, overhead), WIP, and operating results can help to ensure this is being done.

### 3. Types of Analysis

#### a. Labor Analysis

Labor can be dividied into separate categories for analysis:

- (1) Direct Labor- defined as any labor expended to convert direct materials into a finished product. It consists of employees' wages which can be assigned to a specific product. At SA-ALC, direct labor is coded as Duty Code (D/C) 11 (performed on base) or D/C 12 (performed off base).[Ref. 1,5]
- (2) Production overhead labor- labor that does not qualify as direct labor, but is performed in direct support of the production process and cannot be described as general, financial, or administrative. Production overhead can be divided into three categories:
  - a. Indirect labor-labor used within a production cost center that does not meet the requirements for direct labor. Indirect labor at SA-ALC is recorded as D/C 21-29 (supervision, clerical, staff mission, repair, standby, miscellaneous, training, or union activities. [Ref. 1,5]
  - b. Maintenance of Depot Equipment labor-coded as D/C 14 and is labor performed to repair equipment in support of the Directorate of Maintenance.[Ref.1]
  - c. Shop support labor-classified as D/C 20 and includes charges at or above the section levels to include section branch, and division directors and their staff.[Ref. 1]
- (3) General and administrative overhead labor-labor not performed in direct support of production process. Includes general management, general plant maintenance, and financial analysis.[Ref. 5]



Using the duty codes explained above, the labor distribution and cost system collects the hours for each individual in the work force by organization assigned, by type work assigned, and by shift assigned for eight hours each day. This is done automatically until a worker performs a duty different than their usual work, when a worker is loaned to another shop, takes time off for annual or sick leave, or works overtime or on holidays, the supervisor can assign that individual to one of three organizations- a production shop, a production overhead unit, or a G & A overhead unit. The supervisor types in the appropriate duty code and the system automatically programs the work to the applicable area. Production workers are summarized on the direct labor summary (G037G-FD2) and their organizations are classified as the cost centers (RCC's). Overhead and G & A workers are summarized on the labor summary and effectiveness report (G037G-FD1) and their organizations are called Accounting Organization Codes (AOC's).[Ref. 1,8]

The labor system collects regular hours, overtime hours, holiday hours, regular costs, and premium costs then sorts and summarizes these figures by cost center or accounting organization code. Again direct product earned hours are used to distribute the accumulated production overhead costs and G & A overhead cost to the job orders within the respective cost centers.[Ref. 8]

The labor analysis process involves analyzing variances in the separate direct, production overhead, and G & A labor categories. For all three, total variance are subdivided into price and quantity variances. Quantity variances are further subdivided into: On duty hour variance and overtime/holiday premium variances. These variances are calculated by looking at the budgeted hours. Breaking this difference down into regular and overtime/holiday hours and multiplying both by a budget rate (budgeted hours divided by budgeted rate) gives a value for the on duty and overtime variances. The on duty hour variance can be caused by incorrect direct labor efficiencies and indirect labor factors. In order to explain this variance, man-month calculations are done to see if the depot has the correct number of direct labor workers. Along with the man-month calculations, an on-duty factor variance is done to determine how much of the variance is due to the direct workers being exceptioned to indirect labor or leave. An accelerated rate variance, that is, the labor cost per hour what the depot thought it would be, is calculated for the price portion of the labor analysis.[Ref. 8]

#### b. Materials Analysis

Material costs, like labor costs, can be divided into three categories:

1. Direct Material. All materials that form an integral part of the finished product and that can be included in calculating the cost of the product. At SA-ALC, direct material is ordered against a specific Job Order Number (JON).

2. Indirect Material. Those materials needed for the completion of a product, but the consumption of which is so minimal or so complex that treating them as direct material is futile.
3. G & A Material. Material that does not become part of the final product and cannot be identified to a specific product division or JON.

As in the case of labor variances, material variances are managed on an exception basis. In order to accomplish this, material standards are established in the stabilized rate formulation process and updated monthly against which actual usage can be measured.

A total material variance is calculated first and then subdivided into two component variances: (a) price or rate, and (b) usage or quantity. The budgeted and actual information for this analysis is taken from the production cost system. To find the rate variance, the depot multiplies the "actual" standard hours x the actual material rate and compares this with the standard hours x the budgeted material rate. The standard hours are set by the divisions in the budget process and represent the time that should be spent repairing an item. The "actual" standard hours are the standard hours multiplied by the actual hour distribution factor (actual hours charged by the labor system divided by hours available for production). The quantity variance is computed by multiplying the budgeted standard hours x the budgeted rate and subtracting this figure from the "actual" standard hours x the budgeted rate.[Ref. 8]

In analyzing the rate variance, it is subdivided into a price and usage variance. Using the Material Support System the depot finds the standard quantity and price for each item of material that is required for the particular end item being produced. Since the depots receive their material from the stock fund and have little control over the price they pay, a price variance is meaningless to the depots. Material usage analysis runs into similar problems because material is used on an "as needed" basis. With items requiring different material repairs, any meaningful analysis would require setting separate material standards for each end item. Therefore, the depots use an occurrence factor for the development of their budget material figures based upon the incidence of repair for a specific end item over a long period of time.[Ref. 8]

Since the quantity variance is a function of standard hours, it can be explained by either direct labor efficiency being higher or lower than planned in the particular repair group category or the total volume of work has changed in that RGC. When the variance analysis is done in total for all the categories, the variance can be explained by the mix of work load, such as shifting work from a high material rate RGC to a lower RGC material rate work load.[Ref. 8]

Overhead material is budgeted strictly based on history plus any known or anticipated work load requirement changes. Inflation/deflation guidance obtained from AFLC is used for

material overhead areas as it is in direct material. The actual material costs by division are compared against the budgeted costs by month for overhead material.[Ref. 8]

#### c. Other Expenses Analysis

Analysis of other expenses is performed to determine progress towards the budgeted figures. The different types of expenses that fall into this category (e.g. training, base support, utilities, communication, vehicles, equipment rental, travel, MIS, depreciation) are all analyzed and compared with the monthly budgeted figures for discrepancies that exceed plus or minus 5 percent. However, as with all analysis mentioned in this chapter, components of the variances are checked to ensure that separate segments of the variance do not exceed 5 percent. For example, a 4 percent total labor variance can consist of a 6 percent on duty variance and a 2 percent man-month variance. If the total variance is not subdivided into its component parts, the 6 percent on duty variance could be overlooked.[Ref. 8]

#### d. Work in Process Analysis

As with the other analyses, work-in-process actual data are compared with the budgeted figures. The production cost system provides the actual production hours, hours sold, hours remaining in work-in-process, and associated expenses at the repair group category level while the budget figures are taken from the OCBB. Figure 4-1 shows these comparisons



	ACTUAL		RATE (c)	BUDGET		
	HOURS (a)	DOLLARS (b)		HOURS (d)	DOLLARS (e)	RATE (f)
Beg WIP	171,749 (1)	\$12,549,160 (2)	\$73.07	178,423 (11)	\$13,974,089 (12)	\$78.32
Equip Units completed	208,775 (3)	13,826,992 (4)	66.23	199,063 (13)	14,264,855 (14)	71.56
Costs of fin goods	256,286 (5)	17,956,866 (6)	70.07	193,456 (15)	12,811,041 (16)	66.23
End WIP	124,238 (7)	8,419,216 (8)	67.77	184,030 (17)	15,427,903 (18)	83.83
Change in WIP	47,511 (9)	\$4,129.944 (10)		(5,607) (19)	\$(1,453,814) (20)	

Figure 4-1

Comparison of Hours, Costs, and Rates  
RGC E - Engines  
for the Month of Jul 84

for a particular RGC. Beginning work-in-process (items (1) and (2)) and ending work-in-process (items (7) and (8)) totals are taken from the Work-In-Process Summary Report. The cost of finished goods data (items (5) and (6)) are extracted from the Monthly RGC Revenue and Expense Summary. Equivalent units completed are the costs associated with those units begun but not completed during the month of July. The rates (columns c and f) are the dollar values (columns b, e) divided by the hours (columns a, d). Subtracting ending WIP (items 7,8 and 17, 18) from beginning WIP (items 1,2 and 11,12) gives the work-in-process change (items 9,10 and 19,20) In this example, the increase of 53,118 hours (item 9 plus item 19) represents more production occurring than was expected. Also, the \$5.43 difference in the equivalent units expense rate (\$71.56 budget value minus 66.23 actual value) indicates the increased production was accomplished at a lower expense rate. An increase of \$5,145,825 in sales occurred (item 6 minus item 16) at a higher cost rate per direct product standard hour. This increase in sales resulted in a decrease of ending work-in-process of \$7,008,687 (item 18 minus item 8) at months end. A more detailed analysis would then be conducted to further distribute the cost of sales and work-in-process to the separate cost elements (labor, materials, overhead).

#### e. Revenue Analysis

In the budget process discussed in Chapter III, the formulation of sales rates was discussed. Revenue by end

item and commodity group was summarized by repair group category and separate categories of aircraft, engines, missiles, and exchangeables (high volume, lost cost items). In analyzing budgeted vs actual revenues of a specific repair group category, the hours sold is multiplied by the stabilized rate to arrive at an actual and budgeted figure. For example, in FY 1984, the budgeted stabilized rate for repair group category J (exchangeables) was \$72.35. The proposed hours sold (or hours budgeted for repairing the exchangeables) was 1,528,000. However, in actuality, for 1984 it cost San Antonio \$74.31 to repair 1,889,000 hours of exchangeables. The difference (\$29,000,000 or 26%) represents the variance between the proposed and actual revenue for exchangeables for 1984. Reasons for a variance could be nongeneration of assets, parts problems that hampered production, a change in the workload units originally planned for, or, equipment down time. The variance can be expanded to the production control number (PCN) RGC J to determine the exact causes.

#### f. Analysis of Operating Results

In analyzing monthly operating results, the Statement of Revenue and Expenses (Report Number 7118) is examined. This summary of revenues and expenses is compared monthly to budgeted targets. Expenses appearing in the 7118 will later be matched to revenues as costs of sales. The expenses that have been charged to the current month's work-in-process will remain for about three months before a sale occurs. Expenses

that are appearing below budget in the 7118 will produce excess profit as items are completed. By monitoring the monthly 7118, analysis of variances can be performed immediately rather than waiting for final sales to perform commodity analysis.[Ref. 8]

The monthly operating results can be examined in detail by having the production cost system produce the year-to-date Repair Group Category Revenue and Expense Summary. In this report, expenses are divided into direct labor, direct material, other direct costs, operations overhead and G & A. The commodity rates per hour that were projected in the stabilized rate (budget) process, are compared to the most current expense and revenue rates on the revenue and expense summary.[Ref. 8]

Up to this point we have concentrated our discussion on the manner in which SA-ALC examines the variances that occur between the stabilized rates (budget) and the actual cost accounting system. We have seen that the process used in formulating the stabilized rates comes directly from the computerized actual accounting system. Conversely, the actual numbers are continuously compared against the budgeted figures to ensure the validity of the system. In the next Chapter we discuss the figures that are reported to OASD through the 7220.29-H reporting system.

## V. DEPOT REPORTING PROCESS

The previous chapter discussed the actual cost accounting system at San Antonio Air Logistics Center and how the figures accumulated by that system compare with the stabilized rate (budget) system. In this chapter, the Uniform Cost Accounting (UCA) System set down by DoD Instruction 7220.29-H and the reporting requirements of that system is examined.

### A. HISTORY OF THE UNIFORM COST ACCOUNTING SYSTEM

The need for a uniform cost accounting system under which all maintenance depots would fall had been recognized as early as 1963. At that time Secretary of Defense, Robert McNamara, found that there was no one system that all services could use to report their financial and cost accounting data. Consequently, there was no consistent, uniform data upon which upper-level management in the department of defense could use to make decisions. In 1963, two separate uniform systems were established. The first was DOD Inst. 7220.14, "Uniform Cost Accounting for Depot Maintenance," and the second DOD INST. 7220.9, "Depot Maintenance Production Reporting." These two systems were combined in 1968 into DOD INST 7220.29, "Uniform Depot Maintenance Accounting and Production Reporting System." Unable to obtain approval for the new system, OASD made appropriate revisions in the treatment of certain costs and



corrected control and enforcement deficiencies cited by the Government Accounting Office (GAO) and ultimately produced DOD INST. 7220.29, "Guidance for Cost Accounting and Reporting for Depot Maintenance and Maintenance Support," and 7220.29-H, "Depot Maintenance and Maintenance Support Cost Accounting and Production Reporting Handbook." [Ref. 9, 10]

## B. OBJECTIVES OF THE UCA

The objectives 7220.29-H sets out to accomplish are:

1. To establish a uniform cost accounting system for use in accumulating the costs of depot maintenance activities as they relate to the weapons systems supported or items maintained. This information enables OASD to compare costs of repair of similar items at separate depots and also tracks costs of repair of the individual weapons systems.
2. To assure uniform recordation, accumulation, and reporting on depot maintenance operations and maintenance support activities.
3. To assist in the measurement of productivity, the development of performance and cost standards and determination of areas for management emphasis. Obviously, this is the ultimate goal for any financial accounting system, to tell management where the problem areas are or are not.
4. To provide a means of identifying maintenance capability, duplication of capacity and indicate both actual and potential areas for interservice support of maintenance workload. In other words, identify the economies of scale.[Ref. 2]

One of the primary reasons the department of defense established a Uniform Cost Accounting System was to accumulate costs as they relate to the weapon systems supported or items maintained. This information would then be used to help identify maintenance capabilities, duplication of capabilities,

and indicate both actual and potential areas for interservice support of maintenance workload. These types of comparisons and analysis were exactly those discussed in Chapter II under the theory of financial accounting systems. However, problems arise when the information being compared is either incomplete or not indicative of the operations of the organization.[Ref. 2]

#### C. UCA RECORDING REQUIREMENTS

Each maintenance facility is required to maintain a magnetic tape of its incurred costs at the depot. Quarterly updates to the information for completed jobs is required. Within ninety days of the end of the fiscal year, the tape is transmitted to the office of the Assistant Secretary of Defense and a copy of the tape is maintained indefinitely at the depot facility. The system used at SA-ALC to compile the information is called the H036A (Depot Maintenance and Maintenance Support Cost Accounting and Production Reporting System-ALC) system. Appendix A lists the fifty data fields required by the system. [Ref. 2]

#### D. DATA FIELDS

The eighteen of fifty fields with which this study is most concerned, are field 17-35, or those dealing with cost accumulation. These particular fields require the reporting of Direct labor production costs and hours (Fields 17-18), Direct military labor production costs and hours (Field 21-22), Direct material costs, funded and unfunded (Fields 25-29), Other direct

costs, funded and unfunded (Fields 30-31), Operations Overhead, funded and unfunded (Fields 32-33), and General and Administrative expenses, funded and unfunded (Fields 34-35). DoD Instruction 7220.29-H directs the depots on how they will accumulate the costs of maintenance performed under fields 17-35 in accordance with the guidelines set forth in the Uniform Cost Accounting System. The discussion in this chapter centers around these methods to attempt to find out why depot reported costs may differ from the actual costs. Fields 1-16 and 36-50 have no bearing on how the actual costs we are interested in are to be accumulated and reported, and therefore is not discussed in this thesis.[Ref. 2]

#### 1. Labor Costs

Under the Uniform Cost Accounting System (UCA), all civilian labor costs, both direct and indirect, will be costed at current pay rates times an accelerated rate to cover government benefits. In addition, all labor hours and costs will be charged to applicable job orders. Military direct or indirect labor hours worked will be charged as unfunded costs to the appropriate work orders and/or accounts. A timekeeping system will be established and will provide for:[Ref. 2]

1. actual number of hours worked on each job order.
2. actual number of hours available (present for duty).
3. hours available and worked by cost center.
4. time not working by cost center.

5. premium time, overtime and holiday time worked by cost center.
6. loaned and borrowed labor by gaining and losing cost center.

Supervisors are responsible for the verification of the time-keeping records. Time used for job order allocation will be the same as that used for payroll purposes.

Direct and indirect labor classifications under UCA follow GAAP guidelines. Direct labor is that labor which benefits only the job order for which it is performed. All other labor is treated as indirect. Employees classified as direct (those assigned to direct cost centers or RCCs) must charge their time worked to specific job orders. Conversely, employees classified as indirect shall not charge their time to specific job orders unless they are loaned to a direct cost center and perform as a direct employee.[Ref. 2]

## 2. Material Costs

Materials are also divided into direct and indirect. Direct materials are charged to a job order for maintenance requirements (Field 25 in reporting format) and indirect material to the using cost center. Depot maintenance inventories are valued at current catalog list prices or at acquisition cost for non-catalogued items. Materials inventories are to be adjusted at least quarterly to current standard catalog prices.[Ref. 2]

The cost of material furnished by the customer (unfunded), will be determined by the customer. Again, the

price of the materials will be based on current standard catalog price or acquisition price for non-catalogued items. This customer-furnished material will be costed as an unfunded cost (Field 28-29). For exchangeable items classified as repairable (Field 27), an average cost of repair is formulated and modified for anticipated price level changes. This is discussed in Chapter III under the formulation of stabilized rates. The average cost to repair is charged to the job order when the exchange takes place. Any "missing" exchangeables are reported at catalog price, or acquisition cost if non-catalogued, in Field 26 of the production report.[Ref.1,2]

### 3. Indirect Costs

Indirect costs are allocated to job orders by the use of an operations overhead and G & A rate. An operations overhead rate is developed for each cost center in which direct labor is utilized in the performance of its maintenance activities. The total overhead costs consist of all the indirect costs incurred by the cost center plus the allocated share of indirect departments or service centers. Direct labor hours (military and civilian) are used as the basis to allocate operations overhead to a cost center. G & A overhead costs consist of those costs incurred by the maintenance activity plus any G & A costs allocated to it by higher headquarters. G & A expenses are distributed on the basis of total incurred direct and indirect costs of the cost center.

[Ref. 1]



#### E. COMPARISON OF 7220.29-H and SA-ALC FIGURES

The examination of the actual cost accounting system at the San Antonio Air Logistics Center conducted in Chapter IV of this thesis, reveals that SA-ALC appears to be complying with all of the guidelines set forth by the Uniform Cost Accounting System outlined above. Since the H036A system accumulates the actual accounting information recorded at SA-ALC the information forwarded to OASD should accurately reflect the costs of repair incurred at the depot. Therefore, the comparisons conducted or decisions made by OASD of the financial information provided by the 7220.29-H reporting system should be valid, informed and based upon fact. With this in mind, Figure 5-1 is presented.

The number in Figure 5-1 were provided by three (3) separate sources: (1) The figures in the column SAN ANTONIO represent 1984 actual numbers accumulated in that year and reported on the Budget Estimate for 1987 (2) the 7220.29-H numbers were provided by the Office of the Assistant Secretary of Defense and represent the costs reported by SA-ALC to OASD, and (3) The PROPOSED S. R. FIG were taken from the 1984 Sales Rate Brochure for San Antonio which lists the proposed Stabilized Rates for 1984. Looking at Figure 5-1 indicates that the totals reported by the three sources are within 27% of each other. The largest variance by line item between

	<u>SAN ANTONIO</u>	<u>7220.29-H</u>	<u>PROPOSED S.R. FIG</u>
Labor hours	\$9,249	\$8,398	\$8,856
Direct Labor	\$117.359	\$116,521	\$124,781
Direct Materials	201,434	213,869	216,086
Production Indirect	114,835	112,153	113,445
G & A	75,784	88,718	96,885
Total Costs	<u>\$509,412</u>	<u>\$531,261</u>	<u>\$551,197</u>

SOURCE: SA-ALC 1987 SALES RATE BROCHURE

Figure 5-1

Air Force

Fiscal Year 1984

Cost Breakdown By Organic Depot Maintenance Activity  
(\$000)

San Antonio and 7220.29-H is in G & A where there is a 14.5% difference. This also accounts for the most significant difference (27%) between San Antonio and the proposed stabilized rates. The direct labor difference between SA-ALC's actual and the S. R.'s is also rather high (6%). This variance is interesting because although there were more actual hours worked than budgeted for, the overall direct labor expense is less than that figure computed in the budget. More detailed analysis would be required to determine the exact cause of these variances.

In this chapter, the requirements of the Uniform Cost Accounting System were examined. In comparisons with the actual

numbers accumulated by the San Anotnio Air Logistics Center and the proposed Stabilized Rate figures, the three numbers are similar. The reasons for these similarities are discussed in the final chapter, Conclusions and Recommendations.

## VI. CONCLUSIONS AND RECOMMENDATIONS

This chapter presents conclusions, recommendations, and areas for further study.

### A. SUMMARY OF FINDINGS

The purpose of this study was to evaluate the capability of the Uniform Cost Accounting System as developed in Department of Defense Instruction 7220.29-H, to capture repair costs of the San Antonio Air Logistics Center. Also studied was the manner in which the stabilized rates for customer billing are formulated. The systems used to accumulate the actual costs at the San Antonio Air Logistics Center were shown to be the same systems used in the calculations of the stabilized rates. The variations arise when the stabilized rates are sent to the Air Force Logistics Command and the rates are adjusted. These adjustments are not a function of the costs submitted by San Antonio but are factored in to protect the working capital of the industrial fund as a whole and arrive at a zero profit/loss for the fund. A second reason why the accumulated numbers and the numbers represented by the stabilized rate calculations are different is the time span involved. As shown, the stabilized rate calculations take place during the budget process up to 24 months before the beginning of the fiscal year. Although the numbers used in the calculations are based upon

historical data taken from the actual cost system, the factors applied to these figures, such as inflation rates, labor efficiencies and miscellaneous charges, may be incorrect. In the last portion of the study, the actual cost system, the Uniform Cost Accounting system's recording and reporting requirements, and the proposed stabilized rates for 1984 were compared and found to be similar, but not identical.

Although the stabilized rate system has apparently helped the customers of the industrial fund complex by publishing a rate that they will be charged for an entire fiscal year, it has at the same time, increased the difficulties involved in managing the maintenance depots. The three systems addressed in this study--stabilized rates, cost accumulation, and 7220.29-H reporting--are the systems used by San Antonio for control purposes. A brief discussion of how these three systems fit into the control system at San Antonio follows.

Formulation of the stabilized rates is part of the budget process. Planned data in the form of programs, budgets and standards are set during this process that will be used for comparison with actual data. Planning is critical because the revenue generated by the depot is not going to change once the stabilized rates are set by AFLC. Therefore, the managers of the depot, from the shop floor up to the heads of the departments, take an active role in this planning process and are held accountable for their fiscal actions. However, problems



arise when the managers of the cost centers help formulate goals that are changed at AFLC and the resulting goals are unrelated to what was originally submitted by the depot. Also, providing incentives for the workers on the shop floor to work efficiently in order to meet a goal that may call for a loss for the year is a difficult task.[Ref. 11]

The accumulation of actual costs represents the operating portion of the system where information on what has happened both internally and externally is collected and analyzed. The depot uses the budget figures as its objectives and the UCA as its method to track its progress towards those objectives. The actual cost system measures this program by comparing budgeted figures with the actual costs accumulated.

The 7220.29-H reporting requirements satisfy the final piece of the control process by allowing the strategic planners in the chain of command to look at the information accumulated and formulate long term strategies and goals for the future operations of the industrial fund. This information is extracted automatically from the San Antonio data base in the format specified by the Uniform Cost Accounting System and forwarded directly to AFLC. It is eventually forwarded on to the Office of the Assistant Secretary of Defense.

## B. RECOMMENDATIONS

The stabilized rate numbers formulated in the budget process are not going to be the same as the actual numbers accumulated

for the fiscal year. Reasons for this difference are: a different workload than was budgeted, inflation factors for materials and labor could be different than were planned, the workload mix may have changed, indirect and efficiency factors were different, or the historical data base used to budget was inadequate. On the other hand the numbers reported by the depot and forwarded up the chain of command to OASD should be identical. Recommendations to find out why these numbers differ are:

1. Comparisons of the data from all five Air Force Logistics Centers needs to be conducted. This will entail an in-depth study of the system used at the depot to accumulate and input the data into the H036A system.
2. The methods used to check the correctness of the information inputted into the system is required. Are there any checks and balances at the depot to guard against errors?
3. The accumulation of the data at AFLC should be studied. Is the system AFLC uses to accumulate these data reliable and comprehensive? Is the system used by AFLC to forward the data on to OASD actually relaying the identical information it received from the depot or is there an error in the "rolling-up" of the figures.
4. Is the system used at OASD to accumulate the data from AFLC reliable?

#### C. CONCLUSION

This study attempted to determine what differences, if any, exists among the stabilized rate system, the actual cost accumulate system, and the uniform accounting system at the San Antonio Air Logistics Center. All three systems are interconnected and perform a vital role in the depot maintenance accounting system.

The stabilized rate and cost accumulation systems have been shown to differ only in time. The stabilized rate figures being computed from historical data taken from past accumulated costs. The cost accumulation and reporting systems are based upon the Uniform Cost Accounting System set forth by DoD Instruction 7220.29-H. However, the figures arriving at the Office of the Assistant Secretary of Defense are not the exact numbers recorded by the cost accumulation system of the San Antonio Air Logistics Center.

## APPENDIX A

### SALES RATE BROCHURE REQUIREMENTS

#### HOURLY RATES:

1. Rates for each aircraft, by mission design, in Repair Group Category (RGC) A.
2. Rates for each ground launched missile.
3. Rates for each class of other major end item.
4. One composite rate for each RGC for RGC's C, E, G, and J.
5. One composite rate for inertial guidance systems in RGC K.
6. One composite rate for each IM customer in RGC J.
7. One composite rate for other onbase work in RGC's B, D, F, H, K, L, M, N, P, R, and S.
8. One composite rate for all offbase work.
9. One composite rate for all work inducted.

#### END ITEMS SALES PRICES:

1. Prices for each major or minor engine overhaul by type, model, series of RGC E.
2. Prices for each inertial guidance system of RGC K.
3. Prices for each programmed exchangeable.

#### ADDITIONAL MATERIALS REQUIRED:

1. RCC rates
2. A list of the top revenue producing exchangeables in production number order.

## APPENDIX B

### LISTING OF DATA RECORD FIELDS

FIELD NO.	DESCRIPTION OF DATA
	<u>RECORD IDENTIFICATION</u>
1	Record Type
2	Quarter Code
3	Fiscal Year
4	Program Element
5	Facility Name of Code
6	Inside or Outside U. S. Code
7	Owner/Operator Code
8	Reporting Facility Code
9	Item Identification Number
10	Item Nomenclature
11	Standard Inventory Price
12	Weapon or Support System Code
13	Work Breakdown Structure Code
14	Work Performance Category
15	Customer Code
16	Left Blank
17	Direct Civilian Labor (production) Cost
18	Direct Civilian Labor (Production) Hours
19	Direct Civilian Labor (Other) Cost
20	Direct Civilian Labor (Other) Hours



21	Direct Military Labor (Production) Cost
22	Direct Military Labor (Production) Hours
23	Direct Military Labor (Other) Cost
24	Direct Military Labor (Other) Hours
25	Direct Material Cost Funded
26	Direct Material Cost Unfunded (Investment Items at Full Price)
27	Direct Material Cost Unfunded (Exchanges)
28	Direct Material Cost Unfunded (Modification Kits)
29	Direct Material Cost Unfunded (Expenses)
30	Other Direct Costs Funded
31	Other Direct Costs Unfunded
32	Operations Overhead Funded
33	Operations Overhead Unfunded
34	General and Administrative Expense Funded
35	General and Administrative Expense Unfunded
36	Contract/Interservice/Non-Depot Maintenance Activity Cost
37	Government Furnished Material (Investment Items at Full Price)
38	Government Furnished Material (Exchanges)
39	Government Furnished Material (Modification Kits)

40	Government Furnished Material (Expense)
41	Government Furnished Services Funded
42	Government Furnished Services Unfunded
43	Maintenance Support Costs Organic Funded
44	Maintenance Support Costs Organic Unfunded
45	Total Production Quantity Completed
46	Left Blank
47	Quantity of Completed Items Inducted During Reporting Year
48	Quantity of Completed Items Inducted During Year Preceding Reporting Year
49	Quantity of Completed Items Inducted During All Other Previous Years
50	Work Days in Process

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